REMARKS

Upon entry of the present amendment, claims 1-3, 5, 6, 8-15 will remain pending in the above-identified application and stand ready for further action on the merits, with claims 1, 3, and 9-11 being withdrawn from consideration.

Claims 2, 5-6, 8, and 12-15 have been amended, and claims 4, 7 and 16-26 have been canceled without prejudice or disclaimer of the subject matter contained therein.

The instant amendment made herein to the claims does not incorporate new matter into the application as originally filed. For example, the amendments to claim 2 find support in claims 4 and 7 and at page 74, lines 16-17 and page 75, lines 9-11 of the specification. Claims 5, 6, 8 and 12-15 are also amended in accordance with the amendments to claim 2. Further, the instant amendment does not raise substantial new issues for the Examiner's consideration nor require further search on the Examiner's part. At the same time, the instant amendments put the pending claims in condition for allowance and into a more proper format for issuance in a United States patent, by overcoming all outstanding rejections of record.

Accordingly, proper consideration of each of the pending claims is respectfully requested at present, as is entry of the present amendment.

Claim Rejections - 35 U.S.C. § 102(b)

At page 3-4 of the Office Action, claims 2, 4/2, 5/2, 6/2, 7/2, 8/2, 12/2, 13/12/2, 14/12/2 and 15/12/2 are rejected by the Examiner under 35 USC 102(b) as being anticipated by Freytag U.S. '696 (U.S. Patent No. 3,596,696) or Buckwalter U.S. '051 (U.S. Patent 2,927,051) or Jadamus U.S. '076 (U.S. Patent 5,153,076) or Gifford U.S. '050 (U.S. Patent 5,198,050).

Further, claims 2 and 5/2 are rejected by the Examiner under 35 USC 102(b) as being anticipated by Ogawa U.S. '795 (U.S. Patent 4,461,795) or Kaido U.S. '896 (U.S. Patent 5,938,869) or Lin U.S. '583 (U.S. Patent 5,040,583).

Applicants respectfully traverse and request that the Examiner withdraw each of the rejections.

Disclosures of Cited References

Freytag U.S. '696

Freytag U.S. '696 discloses as follows:

> *"An article of manufacture comprising vulcanized rubber bonded to a textile, said textile being either an untreated textile or having an adhesion promoting surface coating thereon, the rubber of said article of manufacture adjacent said untreated or said surface coated textile having incorporated therein, prior to vulcanization, as a first additive, 0.2 to 8 percent by weight, based on the amount of rubber employed, of a member selected from the group consisting of hexamethylol melamine, a lower aliphatic carboxylic acid ester of hexamethylol melamine and a partial lower alkyl ether of hexamethylol melamine wherein from 1 to 5 hydroxyl groups are etherified and, as a second additive, a member selected from the group consisting of resorcinol, m-aminophenol, m-phenylene diamine, resorcinol diacetate, resorcinol propionate, resorcinol butyrate, resorcinol monomethylether, resorcinol monopropylether and 1,5-dihydroxy naphthalene. the amount of said second additive being from 0.5 to 2 times the amount of said first additive, said rubber being selected from the group consisting of natural rubber ,polyisoprene, polybutadiene, polychlorobutadiene and copolymers of (a) butadiene and styrene, (b) butadiene and acrylonitrile, (c) isobutylene and isoprene and (d) ethylene and propylene, and blends thereof, and said textile being selected from the group consisting of rayon, polyamide, polyester, polyacrylonitrile and cotton"* (claim 1 at column 7).

Further, Freytag U.S. '696 describes as follows:

> *"In a large number of rubber articles designated to withstand considerable stresses in use, the rubber is reinforced with plies of textile materials. Thus, tires,*

rubber hose and belts are commonly reinforced with filamentary textiles in the form of yarns, cords or fabric" (column 1, lines 11-14).

Further, in Example 2, the rubber composition containing sulphur, hexamethylol melamine and the like is bonded to nylon cord filaments (column 3).

Regarding properties of the composition of Freytag U.S. '696, the reference describes that the present invention of Freytag U.S. '696 gives an improved adhesion between rubber and untreated textile materials" (column 1, lines 34-36).

Buckwalter U.S. '051

Buckwalter U.S. '051 discloses as follows:

"A method of adhering tire cord to a rubber stock comprising incorporating in said rubber stock resorcinol and the reaction product of formaldehyde and 1,3-diaryl guanidine, thereafter uniting said rubber carcass stock with said tire cord, and thereafter heating the assembly to vulcanize the rubber and form an adhesive-like condensation product from the resorcinol and the 1,3-diaryl guanidine-formaldehyde reaction product, said adhesive-like product adhering said tire cord to said rubber carcass stock" (claim 1 at column 7).

Further, Buckwalter U.S. '051 discloses as follows:

"The classes of textile fibers or filaments that can be adhered to rubbers by the method herein described include native cellulose (e.g., cottons), regenerated cellulose (e.g., rayons), and synthetic lenear polyamides (e.g., nylons)" (column 3, lines 59-63).

"Resorcinol (I) may be introduced into the rubber, or carbon black masterbatch, in its commercially available solid form, as a concentrated aqueous solution, or as a rubber masterbatch. After the introduction of (I) curingaids, accelerators, antioxidants, etc., are then added and are followed by the addition of 1,3-diaryl guanidine-formaldehyde reaction products (II) (granular or powder) and finally sulfur. Table I shows the preferred amounts of (I) and (II) and their practical limits, expressed as parts by weight per 100 parts

of rubber hydrocarbon, required for obtaining optimum results" (column 4, lines 4-14).

"Vulcanizable rubber stocks containing the adhesive-forming chemicals described above can be reinforced with untreated textiles in the several manufactured forms noted earlier. For example, thin sheets or webs of staple fiber in a random or an oriented state may be coated on one or both sides with the adhesive stock to yield non-woven textile-reinforced rubber; or, the fiber may be incorporated into the rubber by milling, etc., and subsequently sheeted to the desired gauge" (column 4, lines 35-43).

Regarding advantages of the composition of Buckwalter U.S. '051, the reference describes *"one advantage of the present invention resides in the use of 1,3-diaryl guanidine-formaldehyde reaction products as one of the adhesive-forming components. This reaction product is nonvolatile, so that at the reacting temperatures, there is no danger of evolution of any noxious or toxic vapors"* (column 6, lines 11-16).

Jadamus U.S. '076

Jadamus U.S. '076 discloses as follows:

"A method of ... adhering a body of a thermoplastic polyphenylene ether containing molding compound to a body of a synthetic rubber material, consisting essentially of:

covulcanizing a body of said polyphenylene ether containing thermoplastic molding compound in contact with a body of said synthetic rubber containing a vulcanizing system of at least a vulcanizing agent and a vulcanizing accelerator and optionally in addition at least one ingredient selected from the group consisting of extenders, age protectors and fillers with heat, said polyphenylene ether containing thermoplastic molding compound having the composition:

(a) 100 parts by weight of polymers of ortho substituted phenols ...

(b) 0-20 parts by weight polyalkenylenes;

(c) 0-100 parts by weight styrene polymers; and

(d) additives;

and said synthetic rubber, containing double bonds, being combined with fillers and plasticizers and being a member selected from the group consisting of (1) styrene-butadiene rubber, (2) polybutadiene, (3) isoprene rubber, (4) isobutene-isoprene rubber. (5) mixtures of at least two rubbers (1)-(4), and (6) mixtures of any one or more rubbers (1)-(5) with up to 80 wt. % of the rubber mixture being substituted by chlorinated isobutylene-isoprene rubber, up to 95 wt. % of the rubber mixture being substituted by natural rubber, up to 60 wt. % of the rubber mixture being substituted by chloroprene rubber or up to 25 wt. % of the rubber mixture being substituted by acrylonitrile-butadiene rubber" (claim 1 at columns 18-19).

Jadamus U.S. '076 discloses as follows:

"Whether one starts with the rubber in spherule form or in powder batch form, the covulcanizable rubber mixtures will invariably contain fillers such as carbon black or silicic acid; extenders such as mineral oils; vulcanizing agents such as sulfur; vulcanization accelerators: and age protectors. A particularly suitable agent which promotes processibility is polyoctenylene"(column 7, 8-15). Further, "Objects which can be manufactured from the covulcanizable masses include brake and coupling pressure plates, rubber-coated rolls; ... vehicle tires" (column 9, lines 6-16).

Regarding advantages of the invention of Jadamus U.S. '076, the reference describes *"The discovery of the present invention is that in fact, excellent adhesive strengths are obtained, if, contrary to the teachings of Dreyfuss and Runge, a chemical bond is produced between a PPE-containing material and certain double-bond-containing, sulfur-vulcanizable rubbers"* (column 4, lines 14-19).

Gifford U.S. '050

Gifford U.S. '050 discloses as follows:

"A pneumatic tire having a bead and a sidewall portion, the bead and sidewall portion reinforced by an annular band, the annular band comprising:
a plurality of filaments having a high extensional modulus of elasticity and a high tenacity bonded together in a matrix of resin;

the filaments arranged to provide the annular band with a tapering configuration from the bead to the sidewall portion; and
wherein the resin is taken from the group consisting of epoxies, polyesters, nylons, and polphenylene ethers and the filaments are taken from the group of aramid, fiberglass, carbon, and polyesters" (claim 1).

Gifford U.S. '050 describes as follows as follows:

"Annular band 22 may be cured or formed from thermoplastic resin such as, for example, nylons or polyphenylene ethers, or thermosetting resin such as, for example, epoxies or polyesters, but is preferably cured or formed from thermoplastic resin. The most preferred thermosetting resin is epoxy. The most preferred thermoplastic resin is polyphenylene ether such as , for example, that sold under the trademark VESTORAN® by Huls Aktiengesellschaft, and especially VESTORAN® 1900 and VESTORAN® 2000. One advantage of using polyphenylene ether as the resin is that it firmly bonds to rubber compositions without the need for an additional adhesive. One such tire rubber composition includes in parts by weight: 100. SBR, 25.0 carbon black, 3.00 aromatic oil, 4.00 zinc oxide, 1.00 stearic acid, 1.50 sulfur, and 1.30 DCBS" (column 3, line 62 to column 4, line 9).

Regarding an object of the invention of Gifford U.S. '050, the reference discloses *"it is an object of this invention to provide a light weight annular band for reinforcing a bead portion and a lower sidewall portion of a pneumatic tire. ... this invention ... provide a tire having improved run-flat capability and handling characteristics. ... this invention ... provide a move uniform and homogeneous tire construction to increase a tire's useful life"* (column 2, lines 13-21).

<u>*Ogawa U.S. '795*</u>

Ogawa U.S. '795 discloses as follows:

> *"A mark for use in rubber article comprising a chromatic rubber composition layer containing not less than 30 parts by weight of at least one of chloroprene rubber and chlorosulfonated polyethylene rubber per 100 parts by weight of total rubber content and having a thickness of 0.1 to 1.5 mm, an antioxidant-migration film barrier selected from polyester film, nylon film, vinylidene chloride film and vinylidene chloride-vinyl chloride copolymer film and having a thickness of 3 to 100 lam, and an adhesive layer selected from thermoplastic polyesters and thermoplastic polyurethanes and having a thickness of 0.005 to 0.5 mm"* (claim 1 at column 13).

Regarding advantages of Ogawa U.S. '795, the reference describes *"the migration of antioxidant from rubber article is substantially completely prevented by using polyester film, nylon film, vinylidene chloride film or vinylidene chloride-vinyl chloride copolymer film which considerably advantageously prevents the migration of staining antioxidant, particularly amine-series antioxidant"* (column 11, lines 56-62).

Kaido U.S. '896

Kaido U.S. '896 discloses as follows:

> *"A pneumatic tire having an air permeation preventive layer comprised of a cylindrical film or sheet heat-fused into a cylindrical shape and free from any connecting portion, said cylindrical film or sheet being composed of a polymer composition containing a thermoplastic resin or a blend of a thermoplastic resin and an elastomer component and having an air permeation coefficient of not more than 25 x 10^{-12} cc • cm/cm^2 • sec • cmHg and a Young's modulus of 1 to 500 MPa, wherein said film or sheet is arranged in such a manner that at least one turn of the film or sheet in the circumferential direction of the tire"* (claim 1 at column 22).

Kaido U.S. '896 discloses as follows:

"The cylindrical thermoplastic resin film of the present invention used may be a single layer or may be a multiple layer film obtained by providing a polyolefin, aliphatic polyamide, or urethane type resin adhesive layer on the two surfaces of the film of the above air permeation preventive resin as described in Japanese Unexamined Patent Publication (Kokai) No. 6-40207 mentioned above...." (column 9, lines 8-14).

Regarding advantages of Kaido U.S. '896, the reference describes as follows:

"...it becomes possible to lighten the weight of the tire without detracting from the retention of air pressure in the tire and, by using as the air permeation preventive layer a cylindrical thermoplastic film, it becomes possible to improve the quality and reliability of the pneumatic tire (that is, since there is no join of the film of the air permeation preventive layer, the elongation at the time of inflation in the tire molding process is constant and therefore the uniformity of the air permeation preventive layer is improved and, also, there is no liability of the join of the film opening up and causing a defective tire at the time of inflation) and possible to improve the efficiency of production of the pneumatic tire (work of adhering film being complicated, while insertion of cylindrical material inside green tire being easy)" (column 21, lines 24-37).

Lin U.S. '583

Lin U.S. '583discloses as follow:

"In a pneumatic tire comprising a plurality of reinforced rubber layers and an innerliner layer laminated together, the improvement which comprises said innerliner layer being a composite structure comprising at least one layer of a thin film of a non-elastomeric barrier material that has an air permeability of no more than 0.05 Barrer at 23°C, and when sandwiched and bonded between two elastomer layers, withstands the conditions required for the vulcanization of the rubber layer has adequate elasticity and extensibility to meet the requirement for fabrication process and functional needs of the tire that it is to become a part of, each of which barrier material layers is sandwiched between two elastomer layers to form said composite innerliner structure, which is adhered to the rubber layer of the tire with which it is in contact" (claim 1 at columns 10-11).

Further, Lin U.S. '583 discloses as follows:

> *"The surface layer of the innerliner of this invention can be any rubber which gives strong adhesion to both the carcass ply of the tire, which is usually the layer next to the innerliner in tire construction, and the barrier material. It is sometimes more advantageous to use a thermoplastic elastomer (TPE) in lieu of a conventional rubber as the base polymer for the surface layer, since the TPEs are more amenable to extrusion into thin films than are conventional elastomers. Any TPE can be used to make the surface layer. The choice is made based primarily on its adhesion to carcass and to the barrier layer, cost, and processibility. Styrene block copolymer TPEs such as those sold under the trademark of "Kraton" by Shell Chemical Company, polyolefin TPEs such as "Santoprene" by Monsanto Company, and polyester TPEs such as "Hytrel" by DuPont are examples of TPEs which work well.*
>
> *Normally, the thermoplastic nature of TPEs is retained in their applications. It is desirable and usually necessary to incorporate appropriate vulcanizing agent in the TPE surface layer to (1) allow the innerliner to be more adaptable in the existing tire making process, and (2) improve adhesion and the chance of co-curing with the carcass ply. To improve the physical properties of the surface layer, the elastomer may be further compounded with reinforcing fillers such as carbon black, tackifying agents, plasticizers, and other modifiers well known to those skilled in the art."* (Column 5, lines 4-32)

Regarding advantages of Lin U.S. '583, the reference describes *"This invention is directed to an improved pneumatic tire innerliner material which will provide substantially improved air pressure retention qualities while reducing the weight of the tire significantly compared to presently used tire innerliner materials"* (column 1, line 67 to column 2, line 3).

Distinctions over the Cited References

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

However, none of the cited references discloses the combination of a tire body comprising a specific vulcanized rubber layer and a reinforcing layer comprising a polyamide resin layer, and the tire body being directly bonded to the reinforcing layer without any adhesive. Thus, the claimed invention is not anticipated by the cited references.

More specifically, Freytag U.S. '696 and Buckwalter U.S. '051 disclose a fiber reinforced tire comprising a vulcanized rubber and a polyamide fiber or textile. However, the references fail to disclose or suggest a combination of a resin layer and a rubber layer. It is noted that adhesion mechanism to rubber of polyamide fiber is completely different from that of polyamide layer. That is, in case of fiber, the rubber is impregnated into the fiber structure of textile, or the whole surface of the fiber is covered by the rubber. Accordingly, the fiber is bonded to the rubber via the three-dimensional structure (*e.g.*, the fiber being incorporated in the rubber) rather than interface adhesion therebetween.

Although Jadamus U.S. '076 discloses chemical bonding between a body of thermoplastic polyphenylene ether and a body of synthetic rubber material, Jadamus U.S. '076 fails to disclose the polyamide resin. Incidentally, since polyphenylene ether is completely different in the chemical properties and structure from polyamide, the combination of polyphenylene ether and rubber does not provide any motivation to arrive at the combination of polyamide and rubber. Gifford U.S. '050 discloses a tire having an annular band comprising filaments and matrix such as nylons. However, since the annular band is contained or built in the tire of Gifford U.S. '050, the adhesion of the rubber constituting the tire and the annular band is not required. Further, Gifford U.S. '050 fails to disclose a process for producing the tire.

Accordingly, Gifford U.S. '050 does not provide any motivation regarding bonding the rubber layer directly to the resin layer without any adhesive.

Further, since a resin film is bonded to a rubber film through an adhesive layer such as polyamide, polyester, elastomer and the like in Ogawa U.S. '795, Kaido U.S. '896 and Lin U.S. '583, each of the references fails to provide any motivation regarding the combination of the rubber layer and the resin layer without any adhesive. Further, the references fail to disclose the specific vulcanization-activating agent.

Therefore, since all the references fail to disclose that the polyamide layer is directly bonded to the vulcanized rubber layer without any adhesive, the present invention is clearly distinguished from each of the cited references.

Incidentally, Jadamus U.S. '076 merely disclose chemical bonding between a resin layer and a rubber layer containing an additive having a carbon-carbon double bond. However, the resin member of Freytag U.S. '696 or Buckwalter U.S. '051 is the fiber which is completely different in the mechanism of the adhesion from that of Jadamus U.S. '076, as explained above. Furthermore, Ogawa U.S. '795, Kaido U.S. '896 and Lin U.S. '583 use the adhesive layer as a essential element, which is not employed by the present invention. Accordingly, there is no reasonable expectation of success to arrive at the present invention by combining Jadamus U.S. '076 with the other references.

As explained above, the present invention (claim 2 and its dependent claims) is not anticipated by the cited references. Applicants respectfully request that the Examiner withdraw the rejections.

Additional Consideration (Nonobviousness over the Combination of the Cited References)

As explained above, none of the cited references discloses or suggests the features of the present invention (*e.g.*, a polyamide layer being directly bonded to the vulcanized rubber layer without any adhesive). Thus, there is no reasonable expectation of success and/or rationale for one skilled in the art to arrive at the present invention based on the combination of the cited references. Likewise, a *prima facie* case of obviousness cannot be established even if the cited references are combined. Thus, the present invention is not obvious over the combination of the cited references.

Furthermore, the present invention exhibits advantageous, unexpected properties over the cited references. Since the resin members of Freytag U.S. '696 and Buckwalter U.S. '051 are fiber, the effect of adhesion of the resin layer and the vulcanized rubber layer cannot be expected from the references. Further, since the resin layer of Jadamus U.S. '076 comprises a polyphenylene ether, the effect with regard to the polyamide layer cannot be expected from Jadamus U.S. '076. Furthermore, the annular band of Gifford U.S. '050 is contained in the rubber tire, and Ogawa U.S. '795, Kaido U.S. '896 and Lin U.S. '583 use the adhesion layers. Accordingly, the effect of the combination of the tire body and the reinforcing layer without any adhesion cannot be expected from the combination of the cited references.

On the other hand, according to the present invention, since the tire comprises the tire body comprising the specific vulcanized rubber layer and the reinforcing layer comprising the polyamide resin layer, the tire body and the reinforcing layer can be directly bonded to each other at significantly high strength without any adhesive even if such a simple structure is employed. These advantageous results are not expected from the cited references.

As explained above, the present invention exhibits the advantageous and unexpected properties. Thus, even if a *prima facie* case of obviousness is properly alleged, such obviousness would be rebutted by the unexpected and advantageous properties as discussed above.

Accordingly, the present invention (independent claim 2 and its dependent claims) is not obvious over the cited references since the cited references fails to disclose or suggest the present invention and further the present invention has unexpected results as explained above.

Information Disclosure Statement (IDS)

Applicants filed a new IDS on Januar y 21, 2009, wherein four (4) Japanese patent documents were listed and copies provided. An initialed copy thereof is respectfully requested from the Examiner in the next communication.

CONCLUSION

Based upon the remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims (*i.e.*, claims 2, 5-6, 8, and 12-15) are allowed.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Toyohiko Konno (Reg. No. L0053), at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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